

Conceptualizing an Adaptive and Data-Driven Equity-Oriented Pedagogy

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Abstract:

This essay conceptualizes an equity-oriented pedagogy that instructors in higher education in America can use to address barriers to equity, access, and inclusion within their classrooms. We formulate this pedagogy by drawing upon existing scholarship that explores democratic, multimodal, assessment-driven, and game-based instructional strategies. We synthesize promising features of these instructional strategies to contribute a new and adaptive approach to pedagogy that is informed by student-learning data. Furthermore, we place this pedagogy under scrutiny and explain why it would be beneficial to evaluate it in various classroom settings.

Key Words:

equity, access, teaching, assessment, pedagogy, academic achievement.

Introduction

Many teachers have described Angelica Gonzales as a “bright and dedicated” student who earned a 3.9 grade point average in high school and excelled in her extracurricular leadership activities (DeParle, 2012). Eager to be the first person to attend college in her family, Gonzales rated the importance of college as a 10 out of 10. She participated in Upward Bound, a college-prep program for low-income students. After spending hours on college applications with mentors, Gonzales earned a spot at Emory University.

Her life goals and aspirations took a sharp turn, however, when Gonzales struggled to excel in a demanding statistics course at Emory. She was working long hours to pay for tuition and could not invest enough time in school to attend office hours and meet her instructor’s high standards for academic success. Unlike her peers, she did not have enough resources or time to hire a tutor. Gonzales’ statistics instructor realized the severity of her struggle later in the course. Unsure of how to support Gonzales in the classroom, the instructor turned to the administration at Emory University for help; despite the administration’s efforts, Gonzales received an F for her final course grade and earned a 2.6 GPA in psychology at the end of her sophomore year. She was placed on academic probation and was eventually asked to withdraw from Emory University. Gonzales had already accrued over sixty thousand dollars in debt, and was making \$8.50 an hour at a furniture store (DeParle, 2012).

Gonzales’ situation portrays a real-life example of how students from minority backgrounds and lower socioeconomic statuses can often face difficulties excelling in higher education. The University of Pennsylvania’s Alliance for Higher Education and Democracy and the Pell Institute for the Study of Opportunity in Higher Education have documented this trend as a systemic issue. According to their report in 2013, 9% of adults from the lowest income bracket earned a bachelor’s degree by age 24, while 77% of adults from the top income quartile earned a bachelor’s degree by the time they turned 24 (Korn, 2015). Gaps in academic performance and graduation rates have been attributed to various factors, such as policies, instruction, assessments, and classroom conditions that do not meet students’ needs, preferred modes of learning, or primary discourse (DeParle, 2012; NEA, n.d.; Tomlinson et al., 2003). By hindering students’ chances to excel academically, these factors can significantly impact students’ dropout rates and socioeconomic status (Bettinger et al., 2013).

There is a need, therefore, to identify ways to create more equitable and accessible classroom environments, which we define as providing equitable opportunities that allow all students, regardless of background (e.g., race, class, gender, ability, sexual orientation, immigration status, etc.), to thrive academically. Our goal in this essay is to explore pedagogical strategies that instructors like Gonzales’ statistics professor can employ to help students succeed.

In this essay, we first describe reasons why educational inequities continue to persist. Next, we illustrate how multimodal, game-based, democratic, and assessment-driven instructional strategies can promote equity. We synthesize promising features of these instructional strategies to conceptualize an equity-oriented pedagogy. Finally, we

place this pedagogy under scrutiny and explain why it would be beneficial to evaluate it in various classroom settings.

Problems with Educational Equity

Multiple scholars have identified several reasons to enhance educational equity. Ahram, Fergus, and Noguera (2011) discuss how students of color are marginalized in our education system. Ahram et al. (2011) state:

In many cases, students affected by disproportionality are less likely to receive access to rigorous and full curriculum and are therefore less likely to be eligible for admissions to a postsecondary institution (Fierros & Conroy, 2002; Harry & Klingner, 2006). Research also shows that many of these students face diminished employment and postsecondary opportunities over the course of their lifetimes (Harry & Klingner; National Research Council, 2002). (p. 2235)

To contextualize how cultural and socioeconomic variables impact equity and access in our study, we must consider that Bourdieu (1973), Lareau (2003), and Delpit (1995) would indicate how inequities are exacerbated when instructors and standardized exams assume a white middle- and upper-class cultural capital for academic success. Cultural capital refers to the knowledge, skills, or education that parents and communities provide to their children that may give them advantages to succeed in the current education system and obtain a higher status in society (Bourdieu, 1973). Bourdieu's (1973) work critiques how the virtue of a white middle- and upper-class cultural capital can determine the ease at which one succeeds or fails academically. Similarly, Lareau (2003) would state that white middle and upper classes have traditionally created curriculum, instruction, and standardized exams; in turn, these social classes have designed an educational system that reinforces their values and ways of being.

Moreover, Lareau (2003) and Delpit (1995) explain that educational inequalities are perpetuated since white middle- and upper-class presuppositions surrounding learning approaches are not explicitly explained or taught to all students. Many children of color and of working-class backgrounds face more challenges excelling because they are less familiar with the protocols for academic achievement (Lareau, 2003; Delpit, 1995). In effect, the American education system obfuscates the influence of cultural capital on one's chances of success or failure by making academic success appear as a meritocracy; the American education system privileges students with a white middle- and upper-class cultural capital. In this way, the American educational system obscures its role in the reproduction of educational inequalities due to its lack of clear expectations for academic success within standardized and school curricula (Bourdieu, 1973; Lareau, 2003; Delpit, 1995).

Lareau (2003) and Delpit (1995) would state that being explicit with the expectations for success can increase equitable opportunities and outcomes. Instructors need to provide students access to the culture of power – i.e., the dominant cultural capital – so they can succeed on standardized exams, in the classroom, and in the workplace. Therefore, Bourdieu (1973), Lareau (2003), and Delpit (1995) would agree that equitable access entails a form of instruction that does not over privilege a hegemonic

form of cultural capital. Moreover, Moll, Amanti, Neff, and Gonzalez (1992) would argue that equity and accessibility are most possible when teachers draw upon their students' funds of knowledge – their backgrounds, skills, and aspirations. As a result, students will likely feel a greater sense of belonging, thus increasing their engagement and potential for academic achievement.

In our opinion, solely having access to the dominant cultural capital is not sufficient for thriving in college. For example, it is possible that Gonzales may have acquired the basic cultural capital to attend Emory University, but she lacked the financial resources to compete with wealthier peers. Below, we will discuss pedagogies that can enhance underrepresented students' success (Nguyen & Phuong, 2016). Although these pedagogies do not directly address the financial issues that students may face, they do carry the potential to make significant impacts on underprivileged students' learning (Nguyen & Phuong, 2016).

Multimodal Approaches to Learning

According to The New London Group (1996) and Stein (2004), multimodality is an approach that integrates multiple modes of learning – visual, auditory, and kinesthetic – and multiple modes of communication – the visual, gestural, and the performative. Simulations, drama, performances, dance, art, videos, music, and the use of technology are examples of multimodal instruction. Stein (2004) and Siu-Runyan (2007) further argue that students need to learn how to analyze and produce multimodal artifacts – such as videos, dance, art, music, and media – because they are surrounded by radio programs, popular culture, and mass consumerism. Siu-Runyan (2007) contends that one-size-fits-all models of learning (e.g., the factory model of education) are obsolete, since we now live in a digital, interconnected, and mediatized world. She claims that multimodal pedagogies are essential in the classroom since the real world possesses many artifacts besides print-based texts. Therefore, multimodality introduces a form of education that is personally and societally relevant to students so they can become active learners. In these ways, multimodal pedagogies can provide greater access to learning so students can better understand, analyze, and transform society.

We will now discuss cultural capital since it is relevant to multimodality, which we will explain below. As mentioned above, cultural capital refers to the knowledge, skills, or education that parents and communities provide to their children that may give them advantages to succeed in the current education system and obtain a higher status in society (Bourdieu, 1973). Students who did not have much access to the dominant cultural capital throughout their K-12 schooling may face challenges navigating academic discourse and succeeding in college.

Multimodality can address issues of cultural capital in two ways. First, multimodality can address barriers to learning and barriers to the dominant cultural capital because it offers images that can help students visualize academic concepts that are foreign to their community or cultural background. Second, instructors can expose students to new multimodal strategies of learning that may have not been accessible to those from underprivileged backgrounds, schools, and communities. These processes can help students from underrepresented backgrounds learn new multimodal strategies to navigate academic discourse and have access to the dominant cultural capital, both of

which can enhance their academic achievement (Cole & Espinoza, 2008; Nguyen & Phuong, 2016). Research supports these propositions since multimodal strategies of learning (e.g., visual images, videos, gestures, mapping ideas out, creating charts, etc.) have been shown to reduce cognitive load for students with limited background knowledge or exposure to dominant cultural concepts (Hattie & Yates, 2014; Nguyen & Phuong, 2016).

Therefore, this pedagogy seeks to increase opportunities and outcomes for academic achievement (i.e., equity) by allowing students to learn, demonstrate, and reinforce knowledge in multiple ways. This multimodal model advances universal design for learning (UDL). UDL is a framework based on the learning sciences that designs for a variety of learners by providing multiple means of engagement, representation, and expression (Meyer, Rose, & Gordon, 2014). By engaging and encouraging students to learn in multiple modes, multimodality has the potential to increase equity by appealing to a wide range of learners.

Research supports how this approach to instruction can enhance learning. John Medina (2009) discusses how these multisensory (visual, auditory, kinesthetic, olfactory, etc.) learning experiences activate larger areas of the brain and increase memory retention. Medina (2009) states that “Our senses evolved to work together—vision influencing hearing, for example—which means that we learn best if we stimulate several senses at once” (Medina 2009, p. 219).

In *Brain Rules*, John Medina (2009) discusses Richard Mayer’s (1997) study that compares learning in unisensory and multisensory environments. We would like to reference John Medina’s (2009) summary of Mayer’s (1997) work. In his study, Mayer (1997) divides the sample into three groups. One group received “information delivered via one sense (say, hearing), another the same information from another sense (say, sight), and the third group the same information delivered as a combination of the first two senses” (Medina, 2009, p. 208). Richard Mayer (1997) found that participants in the multisensory condition performed better in 1) recall over time, 2) problem-solving, and 3) generating 75% more creative solutions than those in unisensory environments (Medina, 2009, p. 208; Mayer, 1997). Consequently, multimodal pedagogy can improve students’ retention of course material because they have multiple opportunities to learn and demonstrate their knowledge through various senses and modes (Mayer, 1997).

Game-based Pedagogy

Other scholars such as Yee (2013), Dockterman (2013), and O'Rourke, Haimovitz, Ballweber, Dweck, and Popović (2014) propose how game-based pedagogy creates more equitable opportunities by integrating game-like mechanics in the classroom. Game-based pedagogy is the application of game-like mechanics in a non-game setting, such as education (Nguyen & Phuong, 2016; Yee, 2013). In most video games, players can complete tasks and/or repeat levels to gain points. These authors bring this concept into the curriculum so that students earn points for demonstrating knowledge and showing they learned necessary course content in various ways, which include completing or redoing assignments. Yee (2013), Dockterman (2013), and O'Rourke et al. (2014) would contend that this system could create a learning environment and assessment model that would change students’ perception of learning, where they are

less stressed and more engaged in strengthening their academic skills as they might in a video game or sport.

At Harvard University, Light (2004) documented how an introductory chemistry professor allowed students to regain lost points on exams, which provided students with the opportunities to make up for earlier mistakes and demonstrate their knowledge of complex concepts. These opportunities motivated students to study and focus more on understanding course content, a characteristic of the growth mindset – i.e., the belief that one's intelligence and skills can grow (Dweck, 2006). Light (2004) also observed increasing enrollment numbers every semester, greater levels of student engagement, higher course grades, and a more equitable and accessible learning environment where all students, regardless of background, thrived. By supporting a non-punitive learning process, these authors would define equity and access as providing all students – privileged and underserved – with greater opportunities and outcomes for academic achievement, since students can redo assignments for more points or a higher grade within a game-based learning system.

In their research, Dockterman (2013) and O'Rourke et al. (2014) found that game-based learning can enhance students' growth mindsets, so that students can focus more on the learning process and improvement rather than the outcome or grade (Dweck, 2006). Growth mindset embodies the idea that through dedication and a strong work ethic a student can learn and improve her or his skill set – that s/he has the ability to grow academically (Dweck, 2006). Game-based learning supports this notion of a growth mindset in that it encourages students to attempt a problem, task, assignment, and assessment more than once to learn and grow from errors made during the first attempt. The fact that one reattempts an assessment to aim for a higher score can indicate their sense of belief, hope, and/or confidence that they will improve on future tries (i.e., the very essence of the growth mindset).

According to Aronson, Fried, and Good (2002) and Blackwell, Trzesniewski, and Dweck (2007), the process of developing a growth mindset among students is an effective way to reduce stereotype threat and create inclusive learning environments. Stereotype threat is a term introduced by Steele and Aronson (1995) which refers to being at risk of confirming a negative stereotype about one's social group. For instance, results from an experiment showed how African American students performed less well when their racial identity was made more salient before testing (Steele & Aronson, 1995).

Reducing stereotype threat can increase equity and access in the classroom since many minority and marginalized students activate negative schemas of their identity, which can hinder their academic performance in classrooms (Davis, 2009; Cohen & Steele, 2002; Cohen, Steele, & Ross, 1999; Steele, 1997). Therefore, facilitating a growth mindset combats stereotype threats by encouraging students to perceive intelligence as a muscle that grows with effort, which is not determined by their background and identities (Aronson et al., 2002; Blackwell et al., 2007). By fostering this growth mindset and its effects, game-based learning can help improve positive psychosocial variables (e.g., resilience, motivation, and self-efficacy) related to students' academic success (Dockterman, 2013; O'Rourke et al., 2014; Phuong et al., 2017).

Democratic Pedagogy and Assessment-Driven Approaches

We turn to McCallum (2013) to highlight how instructors can use assessment and dialogue to facilitate a democratic pedagogy in which students have a voice in co-creating their optimal learning environment. To actualize this democratic pedagogy, teachers can integrate an assessment-driven pedagogy by collecting ongoing classroom data (e.g., student assessment data, surveys, interviews, observations, anonymous instructor evaluations) to adjust instruction based on students' interests and academic needs. Teachers would also engage in dialogue with students to contextualize the classroom data and incorporate their input while modifying instruction. The approach is democratic because it encourages students to participate in personalizing the instruction by voicing their preferences regarding the modes of instruction as well as their individual interests to help inform the content and instruction. Moreover, the frequent collection of data from multiple instructor feedback sources (e.g., observations, surveys, interviews, assessments) allows for a continuous revision of the successful pedagogical strategies and ongoing modifications to the strategies that are not fully meeting all students' needs.

Through the implementation of this model, McCallum (2013) emphasizes the importance of understanding students' backgrounds through questionnaires and intake surveys, which can help instructors identify students' interests, needs, struggles, aspirations, and funds of knowledge. With this student data, an instructor can develop teaching strategies that draw upon their students' backgrounds and funds of knowledge in order to increase their engagement in developing academic skills. By gathering data on students' interests and learning needs (i.e., strengths and areas for growth), instructors can design curricula and assessments in which students have a sense of agency, self-efficacy, community, and purpose – all of which are key intrinsic motivators for learning (Guthrie, Klauda, & Ho, 2013). McCallum (2013) would assert that this assessment-driven pedagogy can help improve equity and access, since it enables instructors to engage students' intrinsic motivators for academic achievement (McCallum, 2013).

McCallum (2013) also explains how teachers can use low-stakes formative and summative assessments to create clear expectations for academic success. On these low-stakes assessments, instructors can ask students questions that mirror the level of rigor that will be expected on graded assessments (McCallum, 2013). Through weekly formative and summative assessments, teachers can ask students to define important terms, explain main points, apply course content, compare and contrast concepts, articulate thematic connections, ask questions, synthesize ideas, and form their own opinions on the course material (McCallum, 2013; Anderson, Krathwohl, & Bloom, 2001). This assessment strategy is a practical way to appeal to students' metacognition because it can help students self-monitor, evaluate their knowledge, reflect on their learning, determine if their viewpoints have evolved, and identify opportunities for improving their academic skills (McCallum, 2013; Davis, 2009; Hattie & Yates, 2014).

Coupled with this reflective, metacognitive process, the use of ongoing, anonymous instructor evaluations can provide students with a safe space to advocate for their needs and inform the instructor of what could best facilitate their learning (McCallum, 2013). With this data, instructors can track and address an individual student's

classroom experiences and understanding of the course material. Moreover, teachers can use this model to diagnose issues with their teaching practices, obtain feedback, enhance their cultural humility, and determine the extent to which they met their instructional goals (McCallum, 2013). Identifying these issues is important; McCallum (2013) adds that the misalignment between instruction and assessment can hinder student success since expectations for academic success can be unclear if the instructor teaches at one level and assesses at a higher level. Therefore, with an assessment-driven model, instructors can better align their instruction with assessments, which can clarify expectations for academic success (McCallum, 2013). According to Hattie's (2009) meta-analyses, these instructional strategies are critical for increasing equity and access because teacher clarity and meta-cognitive strategies have a 0.75 and 0.69 effect size on academic achievement, respectively.

Hattie and Yates (2014), Davis (2009), and Light (2001) have emphasized how the use of ongoing formative and summative assessments of student learning can provide valuable feedback that teachers can use to improve students' learning experience and academic success. Based on meta-analyses, Hattie (2009) found that teachers who continuously adjust and innovate their teaching strategies based on ongoing formative assessments have a 0.90 effect size on academic achievement. Similarly, Darling-Hammond (2015) has touted how such a process is the most cost-effective educational intervention.

Moreover, Knight and Pearl (2000) posit that an optimal learning environment incorporates dialogue and values students' unique approaches to learning. These authors argue that classrooms should be an interesting, engaging, and enjoyable space where students feel a sense of belonging, pursue their passions, see relevance in their education, and excel. Such factors can transform the classroom into a more meaningful and active learning environment, which breeds confidence amongst students and potentially helps increase school retention rates.

Conceptualizing an Equity-Oriented Pedagogy

To achieve the goals stated above, we propose synthesizing specific components of democratic, assessment-driven, multimodal, and game-based pedagogies. Each of these pedagogies has its strengths and limitations in promoting student engagement and learning. Therefore, instructors can hybridize these pedagogies so that they can address the limitations and develop a pedagogy that optimizes equity in their classroom. One main goal is to contribute a framework that guides an equity-oriented pedagogy that can increase every student's opportunities for success.

Through this pedagogical model, instructors strive to transform the classroom into a community where students can empathize with their peers' learning needs and democratically establish classroom guidelines (Freire, 1970; Knight & Pearl, 2000). Following the principles of democratic pedagogy, the instructors would notify students that they have the agency to articulate how they best learn; hence, it is essential for students to co-create their classroom learning environment and assessments (Freire, 1970; Knight & Pearl, 2000). Therefore, students would have a voice in designing and self-evaluating some of their assessments. These assignments (e.g., project-based learning) can enable students to align course objectives, course concepts, their

interests, and real-world skills. This process may lead to heightened engagement, especially when students can develop projects that relate to their interests, funds of knowledge, and aspirations. Furthermore, this pedagogy provides students with opportunities to choose unique approaches to demonstrating knowledge.

For the equity-oriented pedagogy, instructors would also incorporate an assessment-driven pedagogy, which involves adjusting instruction to best serve students' learning needs. To achieve this goal, instructors administer daily course evaluation responses and student assessment data (McCallum, 2013; Tomlinson, 2003). By gathering ongoing data, instructors can also identify the extent to which students have met the stated learning objectives. If learning objectives have not been met, instructors can modify instruction to leverage students' strengths and address their areas for improvement. Throughout this process, instructors can support students in reaching high and rigorous expectations for academic success (Weinstein, 2002).

To further target students' learning needs, instructors could apply multimodal and multisensory teaching strategies. These strategies include a blend of the following: role playing, participatory dialogues, visual PowerPoint lectures, simulations, technology, music production, spoken word, and art. These activities provide an engaging space that can challenge students to practice new ways of learning and demonstrating knowledge through multiple senses and modes.

In the spirit of equity, instructors would integrate a game-based pedagogy to address students' struggles and differing forms of cultural capital and funds of knowledge. For example, to increase opportunities for academic success, instructors can allow students to redo assignments and assessments (similar to their reattempting a level in a game). After students complete specific tasks, they also earn points like in a video game (Yee, 2013; Dockterman, 2013; O'Rourke et al., 2014). These specific tasks include attending class, demonstrating their understanding of course content, taking notes, asking and answering questions, validating their peers' contributions to learning, generating new ideas, and sharing their experiences or insights on course material.

Instructors could also use game-based learning to allow students to work in teams, which can increase students' sense of community when they score points toward common goals. As a team, students must collectively reach a specific amount of points to advance to the next lesson/level; if students reach a higher threshold of points, they are exempt from completing an additional assignment since they have surpassed the lesson's objectives by applying course material in novel ways. To reduce stereotype threat and foster a greater sense of inclusion, the instructors may use this game-based pedagogy to validate and affirm students' academic skills, experiences, identities, and contributions to the classroom (Hurtado, Alvarez, Guillermo-Wann, Cuellar, & Arellano, 2012; Cohen, Garcia, Apfel, & Master 2006). By framing the course as a game, this pedagogy encourages students to self-affirm their potential, validate their peers, and support each other as they progress through the learning odyssey together.

In principle, this equity-oriented pedagogy promotes student learning through greater agency in the classroom, alternative ways of demonstrating competence, and mechanisms for providing low-stakes feedback on instruction. Overall, we hope that this pedagogy can support instructors in designing curricula, instruction, and assessments

that appeal to students' sense of agency, self-efficacy, community, belonging, and purpose – all of which are key intrinsic motivators for learning (Guthrie et al., 2013).

Addressing Concerns about the Equity-Oriented Pedagogy

We acknowledge that several limitations exist regarding this equity-oriented pedagogy. First, the success of this pedagogy rests upon the assumption that instructors implementing it want to improve their teaching and students' learning. This new pedagogy offers these instructors ample opportunity for revision, reflection, and change. However, in the absence of a desire to improve one's course, the potential for a positive outcome is reduced. Below, we address common concerns that continue to arise as we discuss the implementation of this pedagogy.

But, I don't have enough time to implement this complicated, equity-oriented pedagogy!

Although the equity-oriented pedagogy may seem time-intensive, one could use technology to facilitate the assessment process. For example, instructors could administer assessments through online platforms such as canvas, google forms, and SurveyMonkey which provide real-time information and data analytics. In fact, Khan Academy has successfully implemented an ongoing formative and summative assessment process into their online platform, which provides teachers with real-time data and suggestions for how to improve student learning (Murphy et al., 2014). Studies have shown the effectiveness of Khan Academy's game-based learning in certain disciplines, such as math and computer science (Morrison & DiSalvo, 2014; Murphy, Krumm, Mislevy, & Hafter, 2014). According to SRI International's study, teachers believed that the platform was worthwhile, since the student-assessment data helped them prepare and use instructional time more efficiently (Murphy et al., 2014). Moreover, Khan Academy's game-based and assessment-driven platform enhanced student learning, because it increased student engagement, test scores, enjoyment of math, and resilience with tough subjects (Murphy et al., 2014). In short, instructors who have limited time can use online platforms to gather assessment data and student homework responses. With this data, they can determine the content areas that need to be reviewed in class.

In addition, we contend that the benefits of fostering a psychologically safe and inclusive learning environment outweigh the amount of time it takes to implement the equity-oriented pedagogy. In fact, many students of color tend to not ask or answer questions for the fear of "looking dumb" and subconsciously reinforcing stereotype threat (Tatum, 2015; Aronson, Fried, & Good 2002). Through its low-stakes assessment process and approaches to learning mentioned above, this pedagogy can help instructors use multiple forms of classroom data (e.g., formative/ summative assessment, surveys, interviews, observations, anonymous instructor evaluations) to identify students' strengths and areas for academic growth. Moreover, the game-based element of this pedagogy creates a learning environment that offers self-affirmation and validation of students' academic skills, identities, and contributions, which has been shown to reduce stereotype threat, increase achievement, and foster a greater sense of inclusion (Cohen, Garcia, Apfel, & Master 2006; Martens, Johns, Greenberg, & Schimel 2006). To further avoid activating stereotype threat for students, the pedagogy's

ongoing assessment model would not ask for students' background information (e.g., race, class gender, ability, etc.) at the beginning of an exam (Danaher & Crandall, 2008). By allowing students to redo assessments, our game-based approach also encourages students to develop a growth mindset and take creative risks, since they can focus more on the learning process and improvement rather than the outcome or grade (Dweck, 2006). According to Aronson, Fried, and Good (2002) and Blackwell, Trzesniewski, and Dweck (2007), the process of developing a growth mindset among students is an effective way to reduce stereotype threat and create inclusive learning environments.

Since the equity-oriented pedagogy has potential, it would also be important to research how we can change organizational practices in higher education so that faculty have more time to implement equity-oriented pedagogies. Perhaps faculty could work with Centers for Teaching and Learning (CTLs) where they can receive grants that would help them hire a researcher or qualified individual to assist them with the implementation of the equity-oriented pedagogy. Moreover, CTLs offer grants, funding for sabbaticals, and course relief options that help faculty collaborate with other college instructors and professionals in a teaching community (Cox, 2009). These communities can provide faculty with support through open dialogue on classroom instruction and diverse pedagogical scenarios.

Do students in higher education need optimal learning environments? College students are adults!

Creating optimal learning environments is essential in higher education for two reasons. First, an increasing number of college students are coming from low-income, first-generation, and historically underrepresented backgrounds and do not have equal access to resources for academic success (Stevens & Kirst, 2015). Many first-generation students lack home-grown knowledge about college, and numerous students have attended underfunded schools that did not have the resources to adequately prepare them for college. Therefore, these first-generation students need optimal learning environments so they can navigate higher education and have opportunities to excel professionally. Additionally, college students often include immigrants, transfer students, re-entry students, parents, students with learning differences, and the formerly incarcerated – all of whom may benefit from an optimal learning environment to obtain an education and successfully remain in school. A degree in higher education can help them acquire a job so they can become productive members of society.

Second, higher education is a pivotal developmental moment for all students since they use this time in their lives to explore and pursue their professional identities and goals. For many students, being able to excel in college is critical for their confidence and sense of self-efficacy, because they tend to use grades to determine whether or not they should pursue a field. Moreover, students' academic performance or GPA is a predictor of students' bachelor's degree attainment and pursuit of an advanced degree (Cole & Espinoza, 2008). As a result, many students in higher education need to have an optimal learning environment so they can acquire the necessary knowledge and skills to accomplish their goals.

What about unnecessary grade inflation and academic rigor?

One may also argue that our pedagogical model would encourage unnecessary grade inflation. We would respond by referring to Light's (2004) study at Harvard University. According to Light (2004), an introductory chemistry professor allowed students to regain points on exams and consequently noticed significant improvements in student grades. However, this chemistry professor and researchers from the Harvard Assessment Seminars documented positive findings simultaneously occurring with 'grade inflation.' These findings include reduced student competition, greater degrees of student collaboration, and evidence of increased student learning. Moreover, the proportion of science majors who remained in their majors increased, and the number of humanities students enrolling in chemistry courses rose as well. Based on surveys and interviews, students indicated that their experience and learning in these courses improved significantly. Nevertheless, one may argue that this grading model does not recreate the competitive conditions of the real world. We respond by citing Google's study, which suggests that there is no correlation between their employee's a) grades and test scores with b) success in the workforce (Bryant, 2013; Busteed, 2014). In addition, Eric Mazur, a professor of Physics at Harvard, (2013) found that a) his students' score of a perfect 5 on the AP physics exam in high school had no correlation with b) their grades in his physics courses (Mazur 2013). Mazur (2013) further states that grades are a poor measure of learning and that objective ranking via assessment is a myth. Therefore, we would prioritize evidence of increased student learning and a safe, collaborative learning environment over concerns about grade inflation.

In response, one may ask the following: If everyone earns an A, how would employers and graduate schools decide whom they admit? To clarify, we are not advocating for grade inflation or giving every student an easy A in the course. In fact, we also believe a B is a respectable grade, which often indicates that students have met the course learning objectives. Rather, our goal with this pedagogy is for every student, regardless of background, to have an equitable opportunity to earn the highest grade possible in the course. Therefore, we propose the use of multiple assessments that enable and value the different ways students demonstrate their knowledge – which can become a part of the student's portfolio. Instructors could use these multiple assessments to more comprehensively and holistically evaluate a student's understanding of course content based on course objectives and student needs. Therefore, this equity-oriented pedagogy espouses the belief that the purposes of teaching and assessment are focused on student learning, offering feedback, and mastery of course material. The philosophies and practices of this model are not suited for sorting and ranking students by limiting the number of A's in a course.

What about contextualized grading?

One may also argue that the game-based component of our equity-oriented pedagogy would not be necessary when contextualized grading could exist. Proponents of contextualized grades could posit that contextualized grading would explain low grades on a student transcript by providing the average grade in the class next to the students' actual grade. However, contextualized grading may actually disincentivize professors from adjusting their teaching practices, actively reflecting on their instruction, and focusing on improving their students' overall academic achievement. This is possible since faculty could say that a low-grade average will inform graduate schools

and employers that their class was difficult and demanding. Such a mentality could allow educational inequities to ensue since faculty may spend less time addressing issues of low academic achievement in their courses.

With this in mind, we would contend that B's and C's on students' academic transcripts may indicate that these students did not 1) fully grasp course concepts, or 2) acquire the necessary academic skills to excel in that field. These gaps in students' learning could pose barriers to their future academic achievement in upper-division courses within that major. In addition, students who could not excel in these courses may decide to switch majors and not pursue their genuine career goals, since they may feel inadequate after receiving low grades in that field. Such feelings of inadequacy could lead to a plethora of issues (e.g., stress, poor mental health, and increased college drop-out rates), especially when students cannot pursue their passions and then lose a sense of purpose in college.

Therefore, we believe that our equity-oriented pedagogy is a more effective alternative to contextualized grading because it accounts for the psychological consequences of low achievement. With the equity-oriented pedagogy, instructors would have a methodology that would help them adjust their class to provide all students the required knowledge and skills to thrive academically in the course, future courses, and the workplace. Through game-based learning, students can redo assignments and have access to greater opportunities for academic success. Furthermore, the equity-oriented pedagogy emphasizes learning and is applicable in many classes.

What about students who are facing challenges such as working many hours or supporting family? Is it possible that they will likely have less time to redo work?

The intention is not to have a faculty member teach and expect students to redo assignments and address areas for academic improvement on their own. Rather, the goal of the equity-oriented pedagogy is to offer multiple ways for a faculty member to support students' academic achievement by using ongoing assessment to monitor student learning and adjust instruction based on students' areas for growth. With this model, instructors can proactively identify student learning needs (i.e., strengths, misconceptions, and areas for growth) and address them before a student reaches higher-stakes graded assessments (e.g., the midterm and final exams).

Through this process, instructors would first provide clear expectations for excelling on classroom assessments that are aligned with course objectives presented in detailed rubrics. Through the equity-oriented pedagogy, the instructor would provide examples of how to meet the expectations on the rubrics. Then, the instructor would ask students to practice meeting the expectations through multiple means (e.g., discussion, activities, and ongoing ungraded formative/ summative assessment). Next, the instructor will provide ungraded feedback on how students reached these expectations through classroom activities and assessments. If there is limited time, the instructor can use technology, such as learning management systems and/or data collection tools (e.g., Google forms, Qualtrics, SurveyMonkey, etc.) to acquire real-time, student assessment data.

The goal is to prepare students to excel on graded assessments by offering opportunities to reinforce course content in class with low-stakes feedback. These opportunities can allow students to reflect on their learning, ask questions, and identify areas for academic growth. Research has shown that a similar game-based model was applied in higher education where weekly practice, preparation, and feedback equipped students with the knowledge and skills to complete graded assessments efficiently and with mastery (Nguyen & Phuong, 2016; Phuong et al., 2017). This model also allowed students to redo assessments, and many students in the study reported that the opportunity to redo assessments took the stress of grades away (Nguyen & Phuong, 2016). In fact, these students stated that not worrying about grades helped them think more creatively, clearly, and efficiently – which enabled them to focus on mastering concepts (Nguyen & Phuong, 2016). None of these students – many of whom had multiple commitments outside of the classroom – ended up redoing the assignments, reporting that the low-stakes assessment process (i.e., being able to redo assignments) enabled them to take risks, learn from weekly practice, and apply course content in more creative ways (Nguyen & Phuong, 2016). In addition, many students reported reduced stereotype threat since they realized that their academic success and contributions were not predetermined by their backgrounds or identities (Phuong et al., 2017). Rather, these students recognized that their success was heavily influenced by 1) their effort and engagement with course material and 2) the support and validation from their peers and instructor – the responses about effort align with the research on growth mindset (Phuong et al., 2017). Through a game-based learning model, students also expanded their preferred modes of learning since they stated that they felt safe to take risks in developing real-world skills and mastering new ways of learning and demonstrating knowledge (Nguyen & Phuong, 2016; Phuong et al., 2017).

Although we cannot generalize findings from this study to multiple contexts, we would contend that the equity-oriented pedagogy seeks to first support students in reaching course objectives through multiple opportunities for practice, feedback, and reflection. However, with the equity-oriented pedagogy, students – for whatever reason – have multiple opportunities to improve their grade by demonstrating mastery of course material. Furthermore, this pedagogy can help instructors identify and address students' learning needs before students would need to redo their assessments.

We acknowledge that redoing assignments requires more time for teachers. Nevertheless, it can save the teacher time in future sessions and in office hours if students fully grasp course material before moving onto new content. The aim of the equity-oriented pedagogy is that the design (i.e., different components of the pedagogy) will be comprehensive enough so students will engage with the material the first time. However, if students do not fully grasp a concept, they have the option of demonstrating their understanding again in multiple ways.

Moreover, to save time on grading, we would advocate for the use of technology to provide teachers and students with real-time learning analytics. With the equity-oriented pedagogy, an instructor can use campus learning management systems (e.g., canvas), data collection tools (e.g., SurveyMonkey, Qualtrics) or other mediums to capture ongoing student assessment data. We would advocate using data to inform instruction in a way that Khan Academy does. According to Stanford Research Institute (2014),

Khan Academy's "virtually instantaneous nature of the feedback provided to students while working on the problem sets was attractive to educators as well as students" (Murphy, Krumm, Mislavy, & Hafter, 2014, p. 13). The feedback was "provided much faster than the time required for a teacher to grade and return a set of textbook problems, or even the time associated with students trading papers to check each other's work" (Murphy, Krumm, Mislavy, & Hafter, 2014, p. 13). Many educators "reported that it was this aspect of Khan Academy they found most valuable" (Murphy, Krumm, Mislavy, & Hafter, 2014, p. 13). Khan Academy's data reports are intended to "give teachers better information to help improve how they monitor both individual and class understanding, adapt their instruction accordingly, and also provide better feedback and support to students" (Murphy, Krumm, Mislavy, & Hafter, 2014, p. 14). These data functions are being "promoted as one of the primary benefits of these new technologies" (Murphy, Krumm, Mislavy, & Hafter, 2014, p. 14).

In addition, the equity-oriented model can benefit students who are juggling multiple responsibilities outside of the classroom since they would have opportunities to improve their grade if they had to submit an assignment that they did not have enough time to complete in a specific week. Having the opportunity to redo assignments with clear expectations and feedback has shown to decrease student stress, focus students' attention on learning, and significantly improve academic achievement (especially for those with multiple commitments outside of the classroom) (Nguyen & Phuong, 2016; Phuong et al., 2017). Having high-stakes graded assignments can actually increase students' stress (especially for those who have multiple responsibilities outside of the classroom), which can impair their learning by making them worry too much about exams or assignments (Almesalm, Stephane, & Boy, 2017). Currently, academics (i.e., grades and the pressure to excel in the classroom) are a top contributor to student stress and mental health issues (Almesalm, Stephane, & Boy, 2017; Ables, 2016).

Should Equity-Oriented Pedagogy be used as a supplemental resource or in the classroom by college instructors?

While we are not stating that equity-oriented pedagogy should be institutionalized in every classroom, we believe that the equity-oriented pedagogy is best used as a model that instructors can use to improve student learning through evidence-based practices. Limited research has been conducted on the equity-oriented pedagogy's effectiveness in informal learning environments. Further research is needed to consider the impacts of this equity-oriented pedagogy in a variety of classrooms at scale ranging in subject matter, size, and location. Since students' academic achievement (i.e., GPA) is typically assessed through their coursework, we believe the equity-oriented pedagogy is more applicable in classrooms settings rather than as a supplemental resource in informal settings. Nevertheless, elements of the pedagogy have been useful in informal, programmatic, and advisory settings because since it helped administrators use data to address students' needs (Phuong, Nguyen, & Ramos, 2016).

We contend that college instructors have an impact on student learning and success. According to Cole and Espinoza (2008), research on "students majoring in STEM has also reported that supportive educational environments during college were positive indicators of persistence (Bonous-Hammarth, 2000; Grandy, 1998; Leslie, McClure, & Oaxaca, 1998)" (p. 287). In particular, Leslie et al. (1998) found that racial

and ethnic minority students “who complete their science and engineering degree typically emphasize the role of a faculty member as instrumental to their success” (p. 287). Furthermore, promoting students’ “self-concept in STEM-related courses through pedagogical practices like master learning versus performance-driven methods (i.e., competitive) will likely increase performance in high school and college” (Cole, 2007 as cited in Cole & Espinoza, 2008, p. 287). Anaya and Cole (2001) indicated that “academic achievement of Latino students was enhanced when professors were viewed as supportive and accessible” (Cole & Espinoza, 2008, p. 296). This is especially important because “the retention of Latinos, and more specifically the degree completion of Latinos in STEM majors, have reportedly been enhanced by faculty support” (Gloria et al., 2005; Hernandez, 2000; Hernandez & Lopez, 2004; Leslie et al., 1998 as cited in Cole & Espinoza, 2008, p. 296-297). In principle, the equity-oriented pedagogy takes this research into account since it is a model that seeks to create a supportive learning environment between students and faculty. Since instructors can have a direct impact on student learning in the classroom, we highly recommend that college instructors apply equity-oriented pedagogies to improve student achievement.

Moreover, we believe that the equity-oriented pedagogy can benefit students since a “positive interpretation of the campus climate is likely created through the support, intellectual challenge, and encouragement provided by faculty members (Hurtado et al.). In return, positive interpretations of campus climate allows for cultural congruity (Gloria, Hird & Navarro, 2001; Gloria & Rodriguez, 2000), which appear to enhance GPA” (Cole & Espinoza, 2008, p. 296). Moreover, studies that have taken student characteristics into account have “yielded additional evidence that academic and non-academic student-faculty interactions enhance academic performance as measured by college grades” (Anaya, 1992, 1999; Astin, 1993 as cited in Anaya & Cole, 2001, p. 4). Student involvement in “educationally related and distinctly academic interactions with professors appear to improve students’ academic performance” (Anaya & Cole, 2001, p. 11).

Based on this research, we posit that the equity-oriented pedagogy advances a framework that equips faculty to co-create with their students supportive learning environments between the faculty member, students, and their peers. This approach is important since “college faculty and peers can help students with non-college-educated parents create networks and sources of knowledge important for improving students’ academic performance” (Cole & Espinoza, 2008, p. 296). Academic performance or GPA is important because “it is a predictor of persistence, bachelor’s degree attainment, and the pursuit or attainment of an advanced degree” (Pascarella & Terenzini, 2005 as cited in Cole & Espinoza, 2008, p. 296). Based on these premises, we contend that the equity-oriented pedagogy can support success for a diverse range of learners.

Conclusion

If old questions need new answers, here is a new response to educational inequity: an equity-oriented pedagogy that adapts to each classroom, changing student demographics, and a globalized world. This pedagogical model is important and relevant, since higher-education classrooms are enrolling large numbers of first-generation, low-income, and minority students such as Angelica Gonzales.

The equity-oriented pedagogy could have transformed Gonzales' learning experience by allowing her to have greater opportunities to excel academically in college. Based on ongoing formative assessments, Gonzales' statistics instructor could have adjusted the course to better address the needs and preferences of all the statistics students, including Gonzales. Since the game-based learning model is non-punitive and students can re-do assignments, Gonzales could resubmit assignments that she did not perform well on to improve her grade. Hence, if she is behind her peers due to other life obligations, she could have more chances to catch up and meet the class' determined threshold for passing the course and excelling academically. With its ability to adapt to diverse students' needs, this equity-oriented pedagogy could have significant implications for increasing equity in higher education classrooms.

Therefore, it is pertinent for future research to explore how we can transform higher education to enable and motivate faculty to pursue dynamic teaching practices, such as the equity-oriented pedagogy. Education researchers should also examine the equity-oriented pedagogy within diverse classroom settings to observe its impacts on equity. By allowing students to voice their needs and demonstrate their knowledge in various ways, this pedagogical model has the potential to create an optimal learning environment for all students.

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